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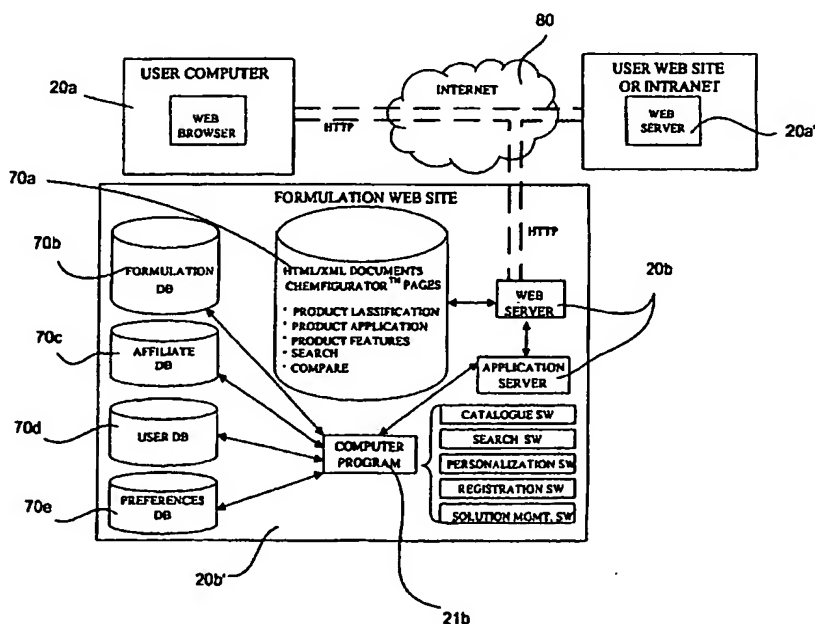
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- (71) Applicant (for all designated States except US): **CHEM-DOMAIN, INC.** [US/US]; Suite 240, 2250 Hickory Road, Plymouth Meeting, PA 19462 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **NORRIS, Eric, W.** [US/US]; 471 Athens Avenue, Wynnewood, PA 19096 (US). **DESOUZA, Walter, C.** [US/US]; 739 Cornerstone Lane, Bryn Mawr, PA 19010 (US).
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(54) Title: **SYSTEM AND METHOD FOR CONFIGURING PRODUCTS OVER A COMMUNICATIONS NETWORK**



(57) Abstract: A system and method for the automated selection of formulations and/or formulation components by specifying product characteristics serve customers within market segments that use selected components as raw materials for manufacture of specialty products. Customers enroll at a web site (20b') to find, research, store, compare and manage formulations.

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## SYSTEM AND METHOD FOR CONFIGURING PRODUCTS OVER A COMMUNICATIONS NETWORK

### TECHNICAL FIELD

The invention relates generally to systems and methods for identifying products for purchase over a computer network. More particularly, the invention relates to the selection and purchase of specialty products over a computer network.

### BACKGROUND OF THE INVENTION

Many industries require sophisticated buyer knowledge or extensive seller hand  
5 holding in order to properly match a product with a buyer's needs, which is typically a time-consuming, human-resource-intensive task. For example, in the specialty chemical or electronics industry, when a component producer, distributor, manufacturer, industry consultant or consortia, virtual distributors or other value-added party (hereinafter all referred to as "supplier" for convenience) introduces a new component(s) (e.g., a new  
10 integrated circuit or new specialty chemical), the supplier must not only inform customers of the availability of the new component but also must inform customers how to integrate the component into a assembled product or formulation (both referred to herein by the term "formulation"). Indeed, some of the suppliers in the chain may provide a new product based on the newly developed component and hence will have to  
15 educate customers about the characteristics of the product. Otherwise, potential customers may not fully comprehend the utility of the new component or product and the advance offered by it, resulting in lack of acceptance and/or lost sales.

Consider, for example, the many uses to which TEFLON has been applied since its first introduction (e.g., coating of pots and pans, as an oil additive, etc.). After its  
20 introduction, the maker of component products such as TEFLON may continue to introduce new product categories to which its advantages may be brought to bear. If TEFLON, for example, was discovered to bring useful properties to a paint product, then the supplier of TEFLON may want to inform paint formulators about the new paint properties offered by the TEFLON additive. In order to provide the information,  
25 particularly to smaller specialty paint manufacturers, the supplier may need to provide a specification sheet outlining the basic ingredient list for formulating a paint product

using TEFLON along with performance characteristics of the sample paint formulation to provide a basis for comparison to similarly positioned product.

After paint developers understand the basic technique for integrating TEFLON with paint products, they could further develop and enhance their own – perhaps secret –  
5 formulations by incorporating the new additive as suggested by the specification. A similar example in a different context applies to the electronics industry. An integrated circuit supplier may have developed a reduced power clock integrated circuit; however, before integrating the product into higher level circuits, electronics manufactures need to understand both the performance characteristics (so as to entice them to incorporate the  
10 new component) and a basic operational circuit (to begin to understand how to incorporate the component into their existing products).

Conventionally, such industries are typified as relying on component specifications that not only describe the performance characteristics of the component but also provide a starter product or formulation that describes one or more basic uses of  
15 the component. Customers can then purchase the component or components necessary to build the example product and use the example as a starting point for integration into their own products.

Typically, such markets are serviced by a myriad of suppliers each offering a similar but somewhat different component, making the task of matching a buyer with an  
20 appropriate component even more complex. Other than the electronic and chemical industries, other industry examples include industrial gases, pharmaceuticals and food products.

The problem of matching customers with proper components may be further magnified by a fragmented distribution system. For example, the value chain for all  
25 industrial chemicals typically contains three steps. First, chemical suppliers (hundreds within the U.S.) manufacture technologies using minerals or petrochemicals as raw materials. Second, manufacturers or 'formulators' in various industries buy directly or via distributor from specialty and commodity suppliers to formulate these chemicals directly into finished goods. Third, the finished goods are distributed for use or sale in  
30 their final markets.

Given the broad range of market segments and chemicals, the customer base for industrial chemicals has historically been quite fragmented. Even with a wave of

consolidation over the past 20 years, there remains a considerable degree of fragmentation in many industrial customer bases. For example, the coatings market, one of the larger markets for industrial chemicals with global revenues of \$60-70 billion (in 1999 dollars), has experienced a tremendous level of consolidation in the 1990's. Yet, according to 1997 research from Kusumgar, Nerlfi & Growney (Chemical Research Group), in the U.S., the top 10 coatings producers account for about 50% of sales, the top 50 producers account for about 75% of sales and the remaining 25% is fragmented among 700 different firms. Hence, using the TEFLON example above, in order to capture as many sales as possible for a new use for TEFLON in the coatings market, the manufacture would have to reach and educate 700 different firms to capture the remaining 25% of the coatings market.

The specialty component of industrial chemicals encompasses chemicals that are the primary building blocks for delivering value-added products in a wide range of industries. Specialties are typically blended or 'formulated' with industrial commodities to provide the unique performance features that an industrial manufacturer would require. Historically, many specialties have been proprietary in nature and therefore had a limited number of competitive alternatives. Key trends of the past few years have been the maturation of technology, the globalization of specialty chemical suppliers and the resultant advent of price competition. In specialties, a growing number of suppliers can offer very similar technology. In cases where there is little other know-how, service or value that accompanies the sale of such a specialty, price has become the lowest common denominator, and the product has become more of a commodity.

However, for a great many specialty chemicals, there is a need for substantial know-how and service (commonly referred to as "tech service") in order to keep up with market, technology and customer trends. In segments where this is the case, the manner of formulation of the various specialty chemicals with commodity components will determine eventual system performance and cost for the customer, which typically cannot be compromised for a lower price specialty alternative. In fact, in some cases, a higher priced specialty component may produce the lower cost system performance due to its efficacy in use. In such segments, specialty suppliers spend a large percentage of sales to handhold their customers and support the adoption of their products. Unlike commodity chemicals that are fungible and price driven, tech service for specialties can

make all the difference in the selling process to maintain premium pricing.

Furthermore, use of tech service has the added benefit of uncovering new customer needs which existing technology cannot meet and, in turn, provides a pipeline for new product development for specialty suppliers. In essence, tech service from specialty suppliers is  
5 really a form of outsourced R&D to their customers.

Typical specialty chemical purchasers desire to purchase their chemicals based on performance criteria rather than on specific ingredients. For example, a small manufacturer of paint desiring to produce a new product line may know the performance criteria required of the new product before actually designating the ingredients that  
10 deliver the required performance. Hence, such a manufacturer may desire an architectural paint that will be sprayed on a metal substrate and have low odor properties without knowing what particular chemical combination would meet those functional needs. On the other hand, specialty chemical manufacturers may have a chemical component or components that, when mixed into paint formulations, work particularly  
15 on a metal substrate while having low odor properties. To date, matching a customer's functional requirements with the proper component or formulation has required human tech service support.

Various Internet sales sites have focused on commodities (e.g., CheMatch, Chemconnect) or laboratory supplies (Chemdex, Sciquest) or supply chain management  
20 (Envera, Elemica). Such sites generally provide customer choice, supplier neutrality and lowest cost for fungible products that are sold on (in these examples, on a chemical composition basis). Since a customer for specialty components typically needs to make a decision on a formulated performance basis using a detailed technical data analysis, current internet models prove inadequate.

25 Hence, there is a need to provide a system and method for matching customers with products that are based on a combination of multiple components whose interaction is hard to predict.

**SUMMARY OF THE INVENTION**

The invention relates to a system and method for the automated selection of formulations and/or formulation components by specifying product characteristics. In particular, the system and method serve customers within market segments that use selected components as raw materials for manufacture of specialty products and that  
5 require an understanding of how the selected components effect performance. For example, such products as electronic circuits, food, pharmaceuticals, industrial gases, coatings, adhesives, sealants, inks, polishes, cleaners, and detergents fall within the profile of such products. According to another aspect of the invention, a method and a software system is provided for enabling suppliers in the distribution channel of  
10 formulations to obtain, classify, and manage formulation information as end user solutions for internal use or in cooperation with Web sites or other network sites of respective business partners. The system and method are implemented in part by software that runs on a Web site, using an ASP model. Any entity engaged in formulation development or support, referred to herein as "customers" or "users", can  
15 enroll at the Web site to use the system to find, research, store, compare and manage formulations. Users access the system directly from a page on their own Web site or on their intranet.

In accordance with another aspect of the invention, business partners, referred to herein as "affiliates", can act as content providers, as they provide selected starting point  
20 formulations to a controlled portion of their customers who are also registered users, thus creating a new vehicle for dissemination of formulations and enriching their customers' library of searchable formulations. Users request authorization from each affiliate they wish to connect to, and are then granted access to formulations the affiliates decide to make available to them.

25 In accordance with another aspect of the invention, formulation data sheets, use guides and test results are collected from users and affiliates, classified, interpreted and stored in the system database. This process enables the formulation to be used as a tool to ascertain direct fit with end user needs, rather than merely providing a list of ingredients.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The foregoing summary, as well as the following detailed description of the preferred embodiments, is better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there is shown in the drawings exemplary constructions of the invention; however, the invention should not be limited to the specific methods and instrumentalities disclosed. In the drawings:

Figure 1 is schematic diagram representing a network computer model in which aspects of the present invention may be incorporated;

Figure 2 is a schematic diagram of an example of aspects of the architecture of the present invention;

Figure 3 is a schematic diagram of an example hierarchical layout of a database in accordance with the present invention;

Figure 4 is an illustration of an alternative data structure of the present invention using a data cube;

Figure 5 is a block diagram representation of aspect of the flow of information through the system of the present invention;

Figures 6A and 6B illustrate block diagrams of a electronic component formulation;

Figure 7 is a flow diagram of the process for compiling formulations for storage on the system of the present invention;

Figure 8 is a flow diagram of a general process for a user to sort through a formulation database to select a set of matching formulations;

Figure 9 is a flow chart that illustrates the flow through the system to arrive at a set of formulations in accordance with the illustrative web pages of figures 10-16;

Figure 10 is an illustration of a user interface for selecting a vertical market to which a set of formulations relate;

Figure 11 is an illustration of a user interface for selecting an end use within a vertical market;

Figure 12 is an illustration of a user interface whereby a customer defines characteristics of the formulation sought;

Figure 13 is an illustration of a user interface wherein a customer ranks characteristics of formulations sought;

Figure 14 is an illustration of a user interface output of formulation according to rank;

Figure 15 is an illustration of a user interface output of particular components of a selected formulation;

5        Figure 16 is an illustration of a user interface for comparing formulations in a side-by-side fashion; and

Figure 17 is an illustration of an auction process in accordance with an aspect of the present invention.

## **DETAILED DESCRIPTION OF THE INVENTION**

### **OVERVIEW**

10        The present invention is directed to an Internet-based platform that aggregates formulations (i.e., product specifications wherein the product is assembled from one or components and wherein the specification impart the understanding to build at least a prototype product) from one or more suppliers. So that manufacturers /suppliers/distributors (herein all referred to as suppliers for clarity) may use the platform  
15 as a standard repository of formulations so that they can provide customers with access to the formulations. The platform further has the capability to retrieve the formulations on the basis of specified performance criteria.

Although the system is useful for individual suppliers to maintain their own sets of formulations, the system may also be employed across suppliers within entire vertical  
20 market thereby providing a standard repository of formulations within a vertical market. As a consequence, customers may provide performance criteria to locate formulations that most appropriately meet their needs from a variety of suppliers.

The invention also presents a system for driving the purchase of the components that comprise the various formulations by purchasing the component or components in  
25 the context of the utility derived from its interaction with the other components of a given formulation.

In the following discussion, the phrase "target segments" refers to those industry segments wherein know-how is essential to supporting and making the sale. In the specialty chemical industry, for example, target segments include coatings, adhesives,  
30 sealants, inks, polishes, cleaners, detergents, pharmaceuticals, agrochemical, plastics,



textile, and so on and total in the billions of dollars globally. Characteristics of the customer base in the target segments are that raw materials (both the specialty components and commodities) frequently are a high percentage of sales, specialty chemical dollar value is about 25% of total raw material cost, barriers to entry related to manufacturing infrastructure are quite low and, consequently, fragmentation of the customer base (particularly at the tail end of the market) is quite significant.

### 1. Formulation Know-How

Formulations are developed by combining multiple specialty and commodity chemicals ("ingredients") supplied by specialty and industrial chemical suppliers. As part of their tech service initiatives, chemical suppliers develop recommended starting point formulations which typically contain ingredients from multiple producers. The interaction of ingredients (in specific quantities and order of addition) is what creates performance characteristics that address the needs of formulators. Unfortunately, starting point formulations are typically classified by main ingredients rather than by performance criteria, which more directly corresponds to a formulator's needs. This issue is confounded by the fact that formulators do not have an effective way of finding and utilizing such starting point formulations due to their many sources, formats, media, versions and credibility. The net result is that formulators must follow a lengthy trial and error experiment process before arriving at a solution that meets the formulator's requirements.

Small customers often source their formulation components from distributors and, consequently, rely on them for tech service. It can be a cost prohibitive/low return effort for specialty component suppliers to focus their own tech service capabilities on smaller buying accounts versus their larger direct buying accounts. Instead, when possible, suppliers resort to training distributor reps on component formulation expertise. Such reps are typically regionally focused, asked to sell a broad range of components and lack a technical background. As a result, these reps are ineffective at offering value-added tech service, and many smaller customers are forced to make uninformed or expensive decisions in choosing the right formulation or component for their need. Some customers may have some in-house formulation or design competency, but it is

typically narrow, embodied in one individual and may not be sufficiently exposed to new developments of components and formulations in the market.

To address the needs outlined, according to an aspect of the invention, the system employs a formulation configuration process. This process begins with a series of inquiries to determine such criteria as the vertical market or target segment in which the customer operates and what the customer's needs are within that market. The system then uses a formulation database to generate formulation and supply options that contain components that match the customer's specified needs. With each option there may be a corresponding performance and cost profile, an order entry form to request sample materials, and testing procedures for verifying test results within the customer's own laboratory.

## 2. Lowest Cost Formulations

Large customers have direct access to the technical personnel of specialty and commodity suppliers who can help them optimize formulations to achieve the lowest cost for a given performance goal. Even still, suppliers often will not, for competitive reasons, make their large customers aware of all possible solutions. Smaller customers, on the other hand, must rely on their local distributor, who not only lacks technical sophistication (as mentioned above), but also typically only support a narrow range of competing commodities. In cases, where commodities can be substituted to achieve an improved cost profile, a single distributor can offer very little. This is a source of significant savings since commodities typically represent between 50-75% of the formulated cost. Consequently, the ability of the small customer to optimize cost is quite limited given the limited choice available.

During the formulation configuration process, the customer can specify both the performance and the cost profile it is seeking. The invention will provide matching solutions and may include a list of possible substitutes for component commodities in the formulation. The customer may then be asked to forecast its annual formulation requirements so that the system can send out electronic requests for quotations. The customer may review all quotation on a 'line by line' basis by individual components or on a formulated basis to ascertain which components and which solution they would like to pursue.

### 3. A Network Environment

Figure 1 illustrates an exemplary network environment in which the invention may be employed. Of course, actual network and server environments can be arranged in a variety of configurations; however, the exemplary environment shown here provides a framework for understanding the type of environment in which the present invention operates.

The network may include client computers 20a, a server computer 20b, and data 70 accessible via server computer 20b. The client computers 20a are in electronic communication with the server computer 20b via communications network 80, e.g., an intranet. Client computers 20a are connected to the communications network by way of communications interfaces 82. Communications interfaces 82 can be any one of the well-known communications interfaces such as Ethernet connections, modem connections, and so on.

Server computer 20b provides management of data 70 by way of server software such as database server system software, described more fully below. As such, server 20b acts as a gatekeeper of data from a variety of data sources and provides that data to a variety of data consumers. Server computer 20b may maintain data in a relational database such as SQL Server available from Microsoft Corporation. Client computers 20a that desire to use access data stored by server computer 20b can access the data 70 via communications network 80. In the example wherein server 20b comprises a database server, such as a SQL server, client computers 20a request the data by way of SQL queries (e.g., update, insert, and delete) on the data stored in database 70.

Database 70 comprises a set of formulations along with other relevant data. For example, the database may comprise a set of specialty chemical formulations for paint, adhesives, ink, and so on. Additionally, the database may comprise a product formulated according to a number of subsystems or components, e.g., computer systems.

Where server computer 20b and client computers 20a are connected by way of an intranet or the Internet, communications may be facilitated by HTML, XML, and so on. Client computers 20a may employ a browser such as Internet Explorer or Netscape Navigator. Client computers 20a may represent suppliers, distributors, and/or buyers of formulations and/or components of the stored in database 70.

#### 4. Formulation Web Server and ASP Model

Figure 2 illustrates an exemplary architecture for the system in accordance with an aspect of the invention. Here, the formulations web site comprises a web server 20b that receives and delivers content to clients 20a by way of the Internet 80. The content is preferably exchanged in the form of HTML, XML, or some like form of data exchange format created and/or maintained in data store 70a. Information in the form of formulation data received, preferably electronically by way of the Internet, from suppliers (e.g., web server 20a') is classified and stored in a database 70b. Formulation web site 20b' also maintains a database of affiliates 70c so that various affiliate information can be maintained and formulation database 70b can be maintained on a affiliate basis. Additionally users can set up accounts and maintain information in database 70d, and set preferences that are stored in preferences database 70e. Hence, the affiliates can use the system in an ASP model wherein all of their data would be conceptually maintained separate from other affiliates. All requests to the affiliate can be redirected to the Formulation web site 20b' to service the request. To a customer, the system would appear as though the affiliate were providing the formulations.

According to an aspect of the invention, users 20a can access formulation data stored in formulation database 70b by directly accessing formulation web server 20b. Therein, user 20a may have access to formulation data in its entirety or to selected formulation data based on a specific supplier. Additionally, user 20a may access formulation data by way of web server 20a', wherein web server 20a' redirects requests over to web server 20b in accordance with know redirection techniques. Once connected to web server 20b, redirected user 20a may have access to formulation data 70b in accordance with a previously arranged subset of formulation data that was negotiated between web server 20b and web server 20a'. This may include for example, all public formulation information maintained in formulation database 70b or a set of privately maintained formulation data maintained by formulation web site on behalf of web server 20a'.

By allowing suppliers to store their formulations on the formulation web site, a common formulation format can be achieved across an industry and a common methodology of extracting formulations based on characteristics can be achieved. As a result, suppliers can combine/group or otherwise share formulation data that is uniformly

accessible. Additionally, supplier can provide the formulation data to distributors or other entities that way desire to have a structured formulation database that can be accessed by way of performance characteristics.

### 5. Formulation Database Structure

5                   Figure 3 illustrates a hierarchical view of one embodiment of the organization of the formulations stored in database 70. The structure of Figure 3 may be conceptually similar to the organization of data in other web site search engines wherein the same formulation may appear at different nodes in the tree and may be categorized under more than one search path. Conceptually, the database is organized by vertical  
10 market 72. Here, example vertical markets 72 include Adhesives, Paint, Sealant, and Ink; however, the invention contemplates the application of the present model to other products comprised wherein those products are configured from a selection of multiple components. Each of the vertical markets is further defined by market segments 73 that help a customer further identify a particular application (e.g., Architectural, OEM,  
15 Special Purpose). Within each of those segments, the formulations are further categorized by application 74 (e.g., siding, trim, wall, etc.). Further categories apply to further classify and categorize the formulations. Here, for example, each of the applications is categorized as interior or exterior 75 and water-based or solvent based 76 and so on until the lowest nodes in the categorization tree provides the categorized  
20 formulation. Note, however, that a given formulation may appear as leaf node under multiple paths through the tree. That is a particular formulation may be suitable in multiple categories (e.g., Architectural and OEM).

                  Although the example hierarchy of Figure 3 shows all of the formulations A, B, and C fitting nicely into the leaf nodes (e.g., Solvent Based), the formulations will  
25 also be categorized within each node along the path (as indicated in the Figure with an "x" in the appropriate node). Hence, for example, Formulation A may be searched for and located under any one of or combination of the nodes "Paint", "Architecture", "Wall", "Interior", and "Solvent Based".

                  Figure 4 provides another example of how the formulations may be  
30 organized and located. Here, an  $n$  dimensional cube 77 provides a pointer to a list of formulations that meet the criteria of the intersection of all of the attributes. For

example, pointer *n* points to a set 78a of formulations that are useful as Special Purpose, Water-Based, Metal applications; whereas, pointer *m* points to a set 78b of formulations that are useful in producing Special Purpose, Solvent-Based, Metal applications.

#### 6. Formulation System

5                   Figure 5 presents a schematic of a system for carrying out the process of the present invention. Essentially, customers 20a enter the system by way of an Internet connection into a web site. There, customers 20a find a formulation based on particular application requirements. Suppliers 20a' and/or distributors 20a'' provide formulations for categorization and storage in database 70. Typically, the formulation information is  
10                   provided by supplier driven research and development. New products and formulations are introduced by way of advertising, samples and etc. provided to customers 20a. Suppliers 20a' and/or distributors 20a'' provide pricing information and accept delivery. The formulations provided by suppliers 20a' and distributors 20a'' are entered into database 70 for selection by customers 20a.

15                   When new products are introduced, suppliers 20a' and distributors 20a'' can provide product advertising, literature, instructional information and so on, in order to educate potential customers about the virtue of a new formulation. Moreover, the instructional information may be precisely targeted based on selections made by customers 20a in arriving at formulation selections.

20                   As eluded to above, customers 20a are generally buying products that require some assembly on the part of customers 20a. Hence, for example, a customer 20a seeking to buy paint is likely to supply end products incorporating the paint to others. For example, they may be a small paint supplier that does not have a sophisticated internal research and development team to discover or invent a new paint  
25                   additive that produces a desirable property. On the other hand, customers 20a may have the sophistication to assemble the components supplied by suppliers 20a' and/or distributor 20a''. So after the customer has selected a formulation, the components will be delivered to the customer for assembly.

                  For example, a paint formulation may comprise a formulation such as the paint  
30                   formulation illustrated in Table 1, below.

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Disperse	Supplier	Wt.	Vol %
Alkyd Resin	McWhorter 5811	206.8	23.91
Titanium Dioxide	Kronos 2090	310.2	9.10
n-Butyl Acetate	Union Carbide	52.7	7.16
Then Add			
Alkyd Resin	McWhorter 5811	206.7	23.90
n-Butyl Acetate	Union Carbide	164.4	22.33
Acrylated Melamine Resin	Solutia Santolink AM 547	100.7	11.32
Flow Modifier	Byk 300	2.1	0.27
Drier Blend			
18% Cobalt	Manosec 18%	1.3	0.14
18% Ziconium	Manosec 18%	4.1	0.45
10% Calcium	Manosec 10%	7.7	0.96
Drier Accelerator	Activ-8 (R.T. Vanderbilt)	2.1	0.26
Anti-Skinning Agent	Exkin #2 (Huls AG)	1.5	0.20

The supplier may designate the properties for this formulation as Application: Exterior, Metal; No Odor; Set-to-Touch, 20 min; Tack Free 90 min; etc. So that the formulation can be classified accordingly, for example, in the tree of Figure 3.

Such a formulation may be delivered to the Formulation Web Server by way of an uploaded XML file. For example, the formulation may follow a format as follows:

<FormulationRecord>

<Category>Paint</Category>

<Market>Architectural</Market>

<FormulationName>Interior Latex - Gold line</FormulationName>

<FormulationAuthor>Golden Coatings S.A.</FormulationAuthor>

<FormulationValidationStatus>Y</FormulationValidationStatus>

<Performance Criterion> No Odor</Performance Criterion>

</FormulationRecord>

5

Upon receiving an XML file bearing a formulation, the system of the present invention will attempt to properly categorize the information. Here, for example, the formulation will be categorized under *Paint*, *Architectural*, etc. Its performance characteristics will be set to *No Odor*, etc. In this way, supplier can continually add new formulations to the system by upload an XML file.

10

An example electronic integrated circuit (IC) formulations are illustrated in Figures 6A and 6B. Here, an integrated circuit manufacturer has developed an IC that has a number of useful applications. For example, as shown in Figure 6A, the circuit can be used to AC couple an external CMOS clock powered from a single positive supply voltage. Whereas, in Figure 6B, the same IC is configured to filter AC signals from high DC voltages. Characteristics for the IC might be 5 volt power, input frequency range 0-20K, clock to cut-off frequency ratio of 100, filter gain at input frequency of 16kHz of -52, etc. Using such characteristic the integrated circuit can be characterized accordingly in a tree structure similar in concept to the tree structure for the specialty chemicals illustrated in Figure 3.

20

Figure 7 provides an example flow diagram of the process of acquiring formulations in accordance with the present invention. The first step (step 702) is a standards gathering process wherein testing protocols available from industry associations and government agencies (such as ASTM) are collected. The output of the gathering process is a classification of the testing standards (step 703). After developing a standard classification system for a given product, Formulation Data sheets, Use guide, Test results and Test methods (various media) are collected from suppliers (step 704) and that formulation data is formatted for storage in a database (step 705). The gathered formulation data is then classified according to the previous designed classification system (steps 706, 707). Where necessary, the standards gathered in prior steps are used to perform manual classification of each formulation, including product data and test results (steps 708, 709). The data is then loaded onto the server and made available for searching (steps 710, 711).

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Figure 8 provides an example flow diagram of the process of a customer stepping through the Formulation Web Site to derive a set of formulations. In a first step (step 802, 803) in the process, the customer enters information that defines the formulation application, e.g., coatings, glue, clock circuits, etc. Thereafter the customer enters limits and prioritizes features in selecting the formulation (step 804). From this, a set of requirements are defined (step 805). These requirements are used to generate a query (step 806) and the matching results are output (step 807). After the results are output, the consumer can view the results and request comparison data (steps 808, 809). The formulation details can be requested and viewed (steps 810, 811). Thereafter, the consumer can select desired ones of the formulations to save for later, purchase components, and etc. (steps 812, 813).

Figure 9 provides an exemplary flow chart of a customer navigation through the system of Figure 5 to arrive at a set of formulations. This flow chart roughly corresponds to the information and user interface described in connection with Figures 10-16. Initially, at step 40, customer 20a selects a vertical market. As shown, in Figure 10, for example, web site 60 presents a web page 62a wherein a customer 20a may select from one of *Paint & Coatings*, *Adhesives & Sealants*, *Personal Care*, *Soap & Detergent*, *Inks & Graphic Arts*, and *Textiles*. In a different context, for example a computer context, customer 20a would select from a different set of vertical markets. Selection of a vertical market from web page 62 causes system 20b to present web page 62b. Here, in accordance with step 42 of Figure 5, customer 20a selects a product end use 620. For example, as shown in Figure 11, under the *Paint & Coatings* vertical market, the user selects the appropriate end use 73 to further define customer 20a's needs. Each of the end uses 73 has an associated drop down menu of selections. For example, selecting drop down box 73a for *Architectural* end use 73 presents the selections shown in box 74a from which a customer 20a may further define the end use. For example, customer 20a may select *Wall*, *Semi-Gloss*, *Gloss*, and *High-Gloss*. Similarly, drop down boxes 73b and 73c, corresponding to *OEM* and *Special Purpose* end uses, respectively, have associated selections 74b and 74c, respectively. After making a selection from the appropriate drop down box 73, customer 20a next further defines the selected product characteristics as indicated by step 44 of Figure 5.

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Figure 12 is an example web page that illustrates one embodiment whereby a customer 20a further defines performance characteristics of the formulation sought. Here, for example, customer 20a is presented with six questions in the form of slide bars and radio buttons. All of these questions are dynamically based on the previously selected end use selected from the previous web page (e.g., web page 62b of Figure 11). For example, customer 20a may further indicate that the formulation sought is *Water Based*, for *Interior* use, to be applied to *Metal* substrate, with a *Spray* on applicator with a VOC level of about 250 g/L, and should possess low odor qualities. As customer further differentiates the formulation sought, some of the characteristics may not be as significant to customer 20a's needs. Hence, some of the characteristics may be defined according to a more fuzzy logic.

Figure 13 presents a web page 62d that illustrates a mechanism whereby the user may rank certain of the characteristics of the formulation sought (in accordance with step 48 of Figure 5). In this example, customer 20a may select certain characteristics and indicate the relative importance of that characteristic to other ones of the characteristics of the formulation sought. For example, customer 20a can set the priority of *Set To Touch* as *Required* and set the priority of other characteristic the same or different such as *Desirable* or *Not Important*. Thereafter and as illustrated by step 50 of Figure 5, a query is generated to query database 70 (see Figure 1) to select the set of formulations matching the customer 20a's selections. The results are output according to a ranking as illustrated by web page 62e of Figure 14. In that output, formulations and unit costs are presented to customer 20a along with the number of set characteristics matched. For example, Formulation 1 had 3 of 3 characteristics that were set to *Desirable*, as indicated by 642. By selecting one of the formulations presented, an additional detailed web page is presented (e.g., web page 62f of Figure 15). In the detailed web page, the formulation is broken down by components along with suppliers that supply various ones of the components.

Customer 20a may choose to compare the various formulations that were resulted from the selected inputs. Figure 16 presents an example web page output 62g that illustrates one such side-by-side comparison. Here, Formulations 1, 2, and 3 are compared to one another along with various characteristics. A unit price may be presented for each that provides an additional basis for comparison.

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According to an embodiment of the invention, after a customer or user of the system has used the system to locate formula of interest, the customer can then follow the formulation to build or fabricate the formulation from the components. Using the formulation of Figure 15 as an example, the customer would disperse the alkyd resin, titanium dioxide, and n-butyl acetate, then add the additional alkyd resin, n-butyl acetate, acrylated melamine resin, and flow modifier, then drier blend the cobalt, zirconium, calcium, drier accelerator, and anti-skinning agent. This starting point formulation could be used for testing purposes, experimentation, manufacture and so on.

According to an aspect of the invention, the starting point formulations can also be used to perform modeling. Stand alone modeling software has been available to run in a WINDOWS Operating System environment such as the Laboratory Module available from BatchMaster Software group of eWorkplace Solutions of Laguna Hills, California. Here, the modelling software would be tied to the formulator output. For example, during the product development process, formulators need to achieve certain performance characteristics. As they achieve a certain level of performance, formulators perform lab bench experiments to test how a formulation's performance properties react to changes in ingredients. This trial and error process allows them to fine tune a formulation and establish the best set of properties they can find. Such experiments are performed in a controlled environment, i.e., only one ingredient is changed at a time, and resulting performance properties are recorded. For example, a flat paint formulation may contain ingredients such as: water, solvent, thickener, inert pigment, anti-freeze, latex, Titanium Dioxide, and the formulator may have properties goals such as Ph= 8.5 to 9.0, KU=95 to 100. One set of experiments may include testing 4 types of thickeners and record the resulting values of Ph and KU.

Most of a chemist's time is spent running those experiments (which includes setting it up, testing, measuring results and documenting them). The model will use statistical regression to predict the performance properties (Ph and KU in our example) associated with additional thickener types by using the original thickeners data points along with the corresponding performance properties. If the regression successfully explains enough of the correlation between those two types of variables (thickener and Ph/KU), the formulator would be able to skip a number of experiments thus saving significant time.

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According to an alternative embodiment, the system may generate a list of formulation options or solutions that includes a list of substitute commodity raw materials which are interchangeable within the formulation and "typical" pricing on these commodities.

5           According to an aspect of the invention, after a set of formulations are selected that met customer 20a qualifications, components of the formulation are available for purchase by the customer. This can be done according to a straight forward purchase at the quoted price, either directly or by way of a distributor, or alternatively according to an auction methodology. It should be appreciated that a customer can also  
10 go directly to the set of formulations or a particular formulation by, for example, performing a search on the web site.

          According to one auction embodiment, component suppliers provide a price to supply components based on the total amount required. Thus if a component is fifty percent of one formulation and 60 % of another, a better price may be offered on the 60  
15 % formulation. Because the unit cost of the formulation is a function of the combination of all of the components, the comparison price of the various formulations will depend on the assembled cost of all of the separately priced components.

          According to another auction embodiment, specialty ingredients within the formulation are specified as "no equal", but all other ingredients are specific as "as  
20 equal". An electronic reverse auction commences in which participants (i.e., suppliers 20a' and/or distributors 20a") bid on individual components within the formulation over a fixed timeframe. Customer 20a is able to observe the bid and see how the formulated cost declines with each lower input price offered. Customer 20a chooses set of distributor(s) 20a" and supplier(s) 20a' for a quarterly contract based upon lowest price  
25 and other intangibles (quality of distributor service, etc.). Each distributor 20a" or supplier 20a' will be linked to an electronic order entry interface that each customer 20a will use for future order fulfillment and technical service on an ongoing basis.

          The invention will track pricing, purchasing patterns and commodity trends on behalf of its customers 20a in order to alert them when cost improvement opportunities  
30 become evident or it has become appropriate to re-bid based on changed market conditions.

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Figure 16 further illustrates the auction feature in accordance with an aspect of the invention. In this example, a customer 20a is presented with three competing formulations. Each formulation may have slightly different characteristics but each was selected by the system as meeting the customers stated performance specifications. All of the formulations contain similar ingredients. For example, they all contain ingredients Y and Z, albeit in slightly differing amounts. Formulations A and B each contain ingredient X but in slightly different percentage compositions; whereas formulations B and C each contain ingredients W in the same percentage composition. Each of the different ingredients may be supplied by different suppliers 20a'. For example, Supplier 1 supplies U, Supplier 2 supplies X, and Supplier 3 supplies Y. The total price of a given formulation is controlled by the combined price of all of the ingredients. So that the effect of a particular ingredient on the overall price of a particular formulation is a function of its percentage of the composition as well as its price. Hence, if Formulations A or C are accepted by the customer, Supplier 3 will have sold a larger percentage of the formulation than if Formulation B is accepted (10% versus 7%). The same is true for Supplier 1 with respect to Formulations A and C (if Formulation B is sold Supplier 1 makes no contribution to the sale) and Supplier 2 with respect to Formulations A and B.

The dynamics of multiple suppliers 20a' having disparate interests in the overall transaction may operate to change the price of the bids for each of the formulations offered to customer 20a.

While the invention is susceptible to various modifications and alternative constructions, certain illustrated embodiments have been shown in the drawings and accompanying detailed description. It should be understood, however, that there is no intention to limit the invention to the specific constructions disclosed herein. On the contrary, the invention is intended to cover all modifications, alternative constructions, and equivalents falling within the scope and spirit of the invention.

**CLAIMS****WHAT IS CLAIMED IS:**

1. A method for locating formulation over a network-based system, comprising:  
classifying a plurality of product formulations according to a set of functional characteristics;  
5 receiving from a customer a plurality of inputs indicative of a set of functional characteristics; and,  
presenting formulation components from said plurality of formulations for comparison of price and performance characteristics so that a customer may assemble said components into a formulation.
- 10 2. The method of claim 1 wherein the network is an internet.
3. The method as recited in claim 2 wherein the customer inputs are received in directly by way of an intermediary web site.
4. The method according to claim 1 wherein the act of presenting comprises delivering the data over the network to the customer computer.
- 15 5. The method of claim 1 wherein the product formulations comprise specialty chemical components.
6. The method of claim 1 wherein the product formulations comprise electronic circuits.
7. The method of claim 1 wherein the act of classifying comprises providing a hierarchical data structure wherein nodes in the hierarchical structure represent  
20 functional characteristics of a class of formulations.
8. A computer-readable medium bearing computer-readable instructions for carrying out the acts recited in claim 1.

9. An Internet-based method for selling a component comprising the acts of:  
providing a database of formulations wherein at least one formulation comprises the component to be sold;  
accepting input indicative of performance characteristics of selected ones of said  
5 formulations;  
selecting all formulations in the database matching the performance characteristics;  
outputting the selected formulations and offering said component for sale when said formulation comprises said component.
10. The method as recited in claim 9 wherein the customer inputs are received indirectly  
10 by way of an intermediary web site.
11. The method according to claim 9 wherein the act of outputting comprises delivering the data over the internet to the customer computer.
12. The method of claim 9 wherein the product formulations comprise specialty chemical components.
- 15 13. The method of claim 9 wherein the product formulations comprise electronic circuits.
14. The method of claim 9 wherein the act of providing a data base comprises a classification database comprising a hierarchical data structure wherein nodes in the hierarchical structure represent functional characteristics of a class of formulations.
- 20 15. The method of claim 9 further comprising the act of accepting a bid price for at least one component of the formulation.
16. A computer-readable medium bearing computer-readable instructions for carrying out the acts recited in claim 9.

17. An Internet-based method for selecting components comprising the acts of:  
providing a database of formulations wherein the formulations comprise components;  
accepting input indicative of performance characteristics of selected ones of said  
formulations;  
5 selecting formulations in the database matching the performance characteristics;  
outputting the selected formulations in the form of a list of constituent components.
18. The method of claim 17 further comprising the act of accepting input indicative of  
an order to purchase at least selected ones of the constituent components output.
19. The method as recited in claim 17 wherein the customer inputs are received  
10 indirectly by way of an intermediary web site.
20. The method of claim 17 wherein the product formulations comprise specialty  
chemical components.
21. The method of claim 17 wherein the product formulations comprise electronic  
circuits.
- 15 22. The method of claim 17 wherein the act of providing a database comprises providing  
a hierarchical data structure wherein nodes in the hierarchical structure represent  
functional characteristics of a class of formulations.
23. The method of claim 18 further wherein the act of accepting an order comprises the  
act of accepting a bid price for at least one component of the formulation.
- 20 24. A computer-readable medium bearing computer-readable instructions for carrying  
out the acts recited in claim 17.
25. An Internet-base method for providing formulation data comprising the acts of:  
accepting from a supplier information indicative of a formulation;  
categorizing the data based on performance characteristics;



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storing the formulation in a database such that it is retrievable from the database on the basis of the categorization;

accepting request from said supplier for a said formulation based on the supplier specifying performance criteria;

5 providing the specified formulations back to the supplier.

26. The method as recited in claim 25 wherein the formulation data is separately maintained in the database based on the supplier.

27. The method of claim 25 wherein the supplier information comprises a file of information received from the supplier by way of the Internet.

10 28. The method of claim 25 wherein the act of accepting requests from the supplier for the formulation comprises a redirected request from a customer of the supplier.

29. The method according to claim 27 wherein the file is transferred in an XML format.

30. A method of selling specialty components in a formulation, comprising the acts of: presenting a set of components used in the formulation;

15 accepting a bid from a first supplier to provide a first component at a first price;  
accepting a bid from a second supplier to provide a second component at a second price;  
and  
providing a price of the formulation based on the first and second prices.

31. The method of claim 30 further comprising the acts of:

20 presenting a second formulation comprising a third component;  
accepting a bid from a third supplier to provide the third component at a third price;  
providing a price of the second formulation based on the third price.

32. The method of claim 30 further comprising the act of accepting an acceptance to buy the components of the formulation based on the first component at the first price and

25 second component at the second price.

33. The method of claim 30 further comprising the act of accepting an acceptance to buy one of the formulation or the second formulation based on the provided prices.

34. A method of preparing a formulation, comprising the acts of:  
5 specifying a set of performance characteristics that a formulation should possess;  
transmitting to a server over an internet said set of performance characteristics whereby  
said server can match selected ones of formulations stored in a formulation data store  
and transmit the selected ones of formulations back to the requestor;  
receiving the matching selected ones of formulations; and  
10 preparing at least one of the selected ones of the formulations.

35. The method as recited in claim 34 wherein the formulations comprise chemical formulations.

36. The method as recited in claim 34 wherein the formulations comprise electrical formulations.

15 37. A computer-readable medium bearing computer-readable instructions for carrying out the acts recited in claim 34.

38. A method for locating formulation over a network-based system, comprising:  
receiving a first set of product formulations from a first product formulation  
supplier;  
20 receiving a second set of product formulations from a second product formulation  
supplier;  
classifying the first and second set of formulation according to a set of functional  
characteristics;  
grouping the formulations based on the supplier whereby the formulations can be  
25 based on one of the first and second product formulation supplier and the combination of  
the first and second formulation supplier;

-26-

receiving from a customer a plurality of inputs indicative of a set of functional characteristics;

selecting formulations from a supplier grouping wherein the classifications match the input functional characteristics; and

5        outputting the selected formulations to the customer.

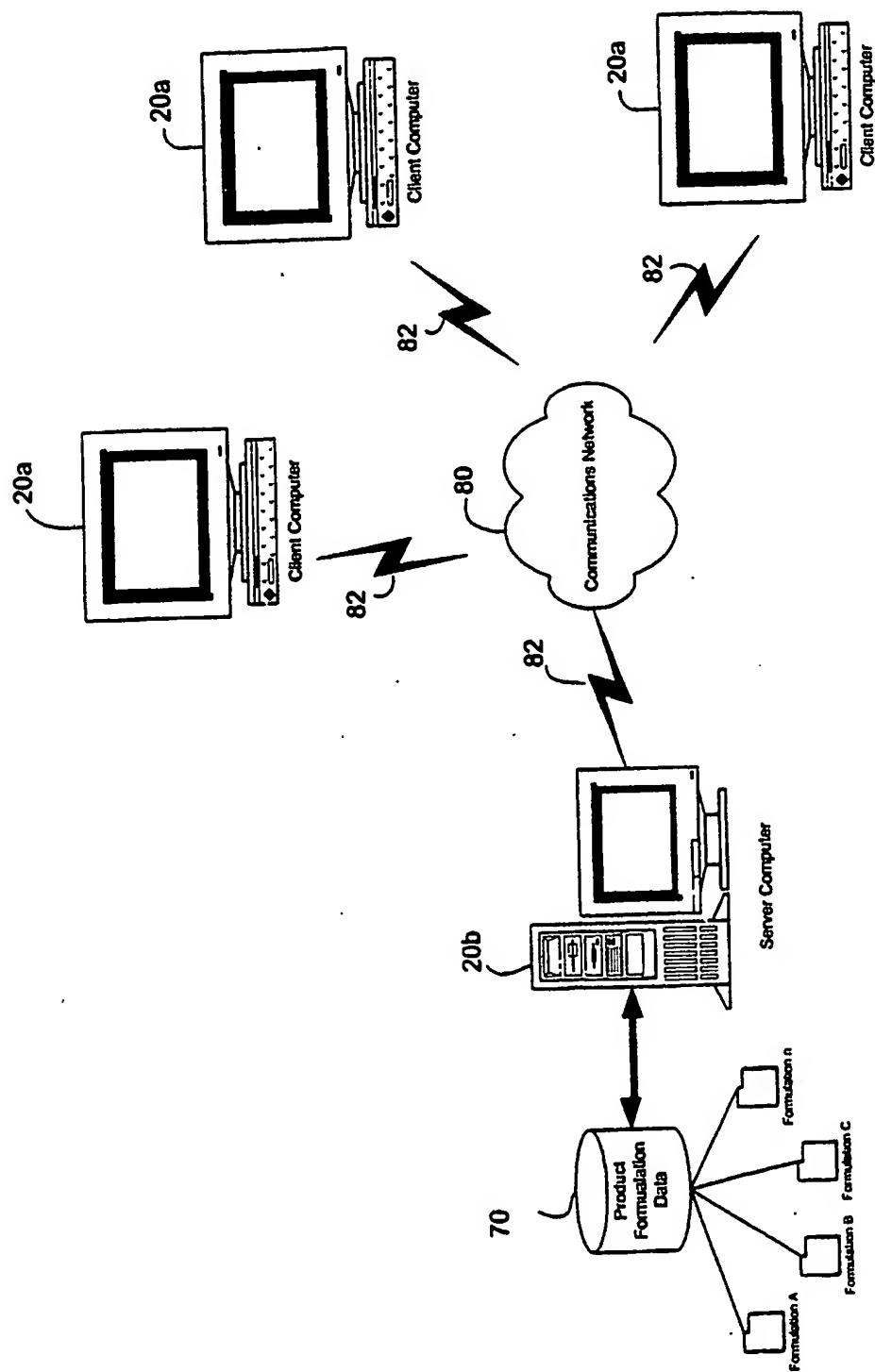


Figure 1

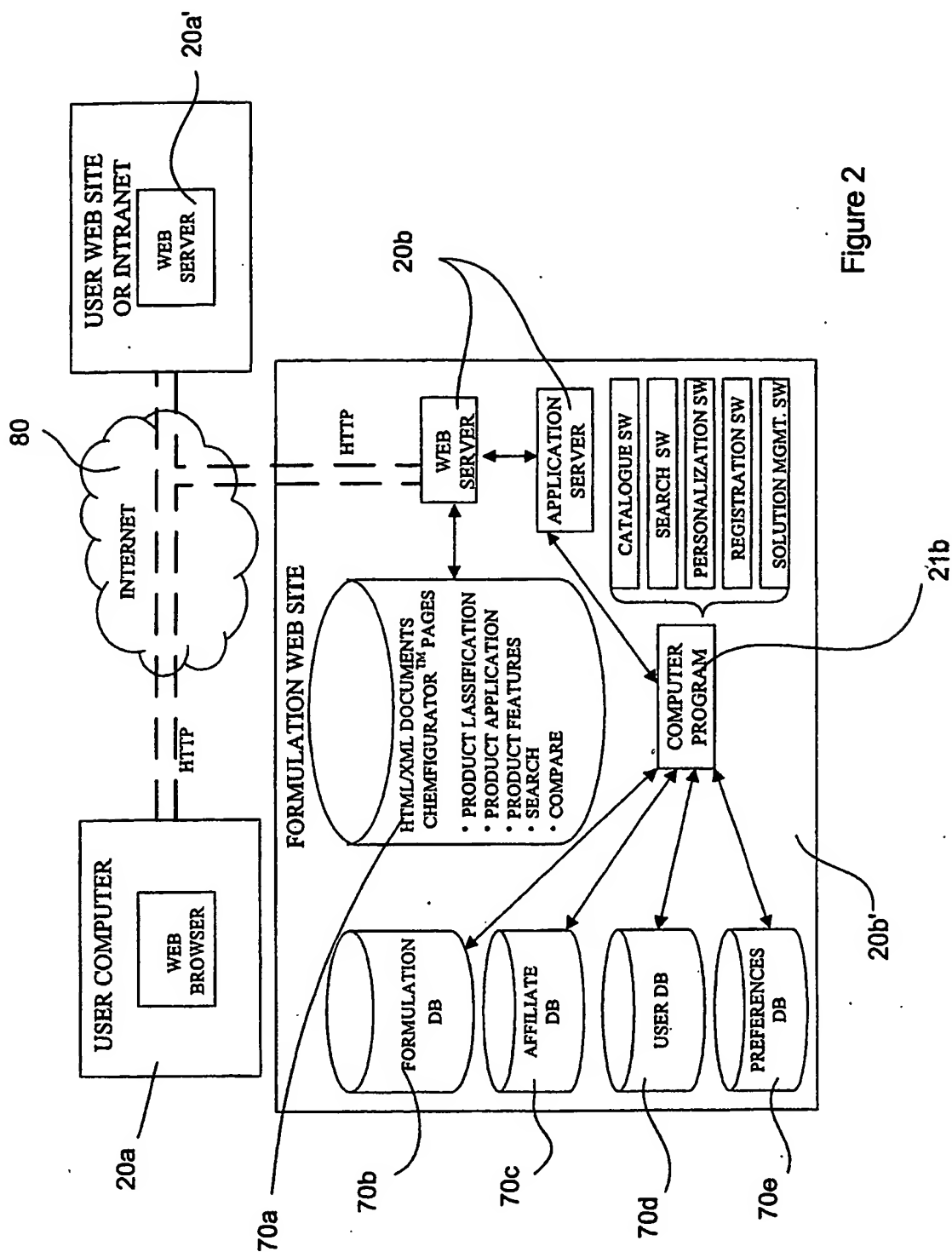


Figure 2

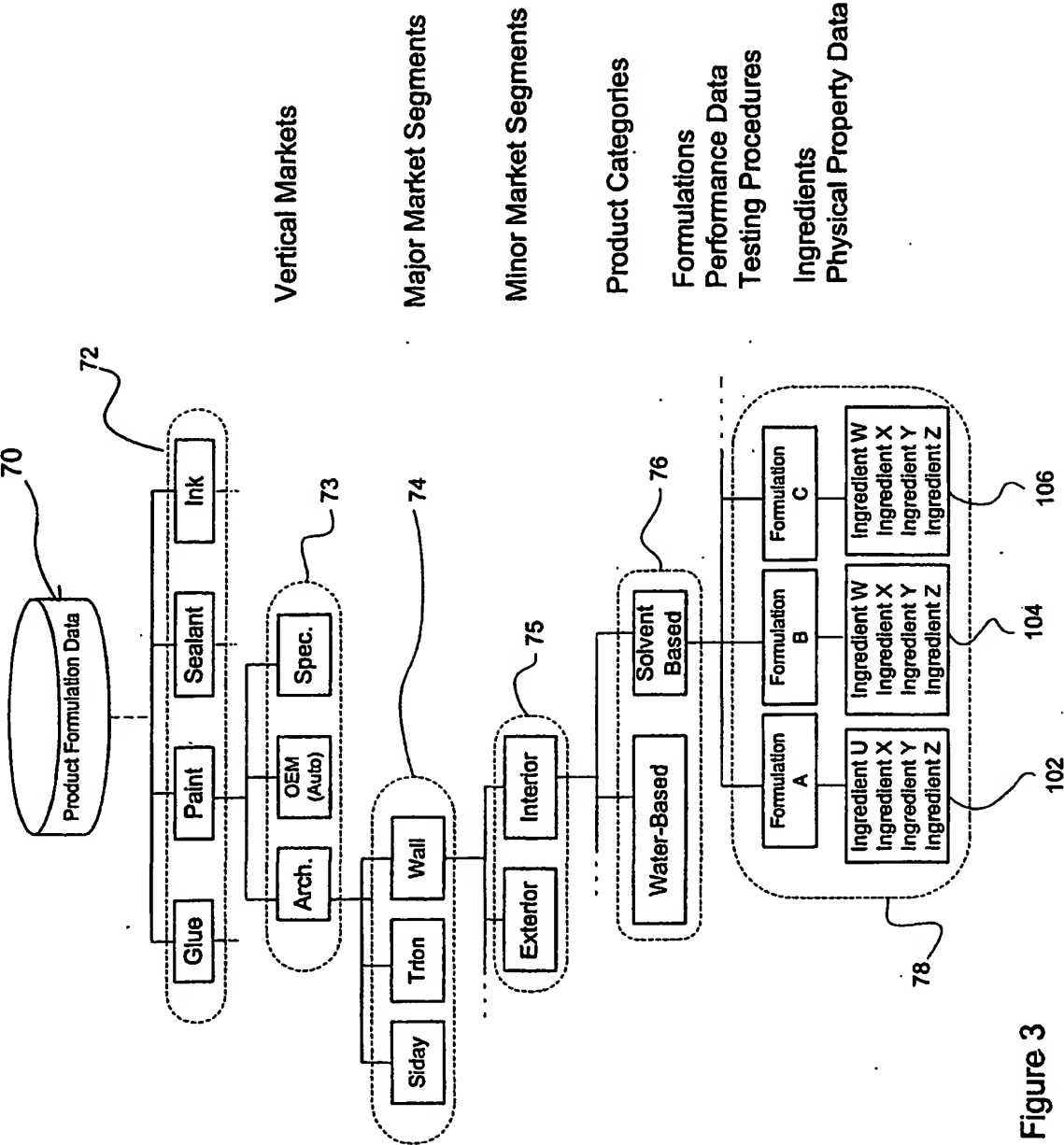


Figure 3

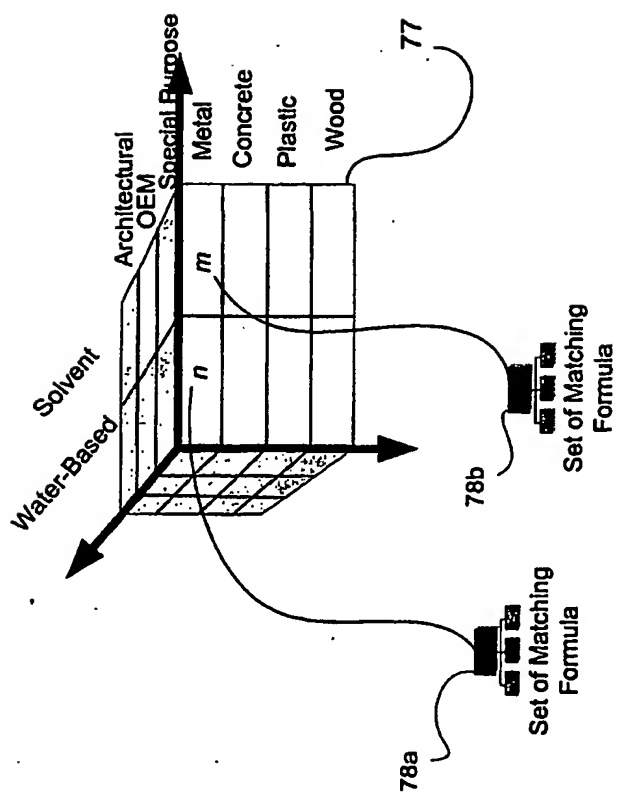


Figure 4

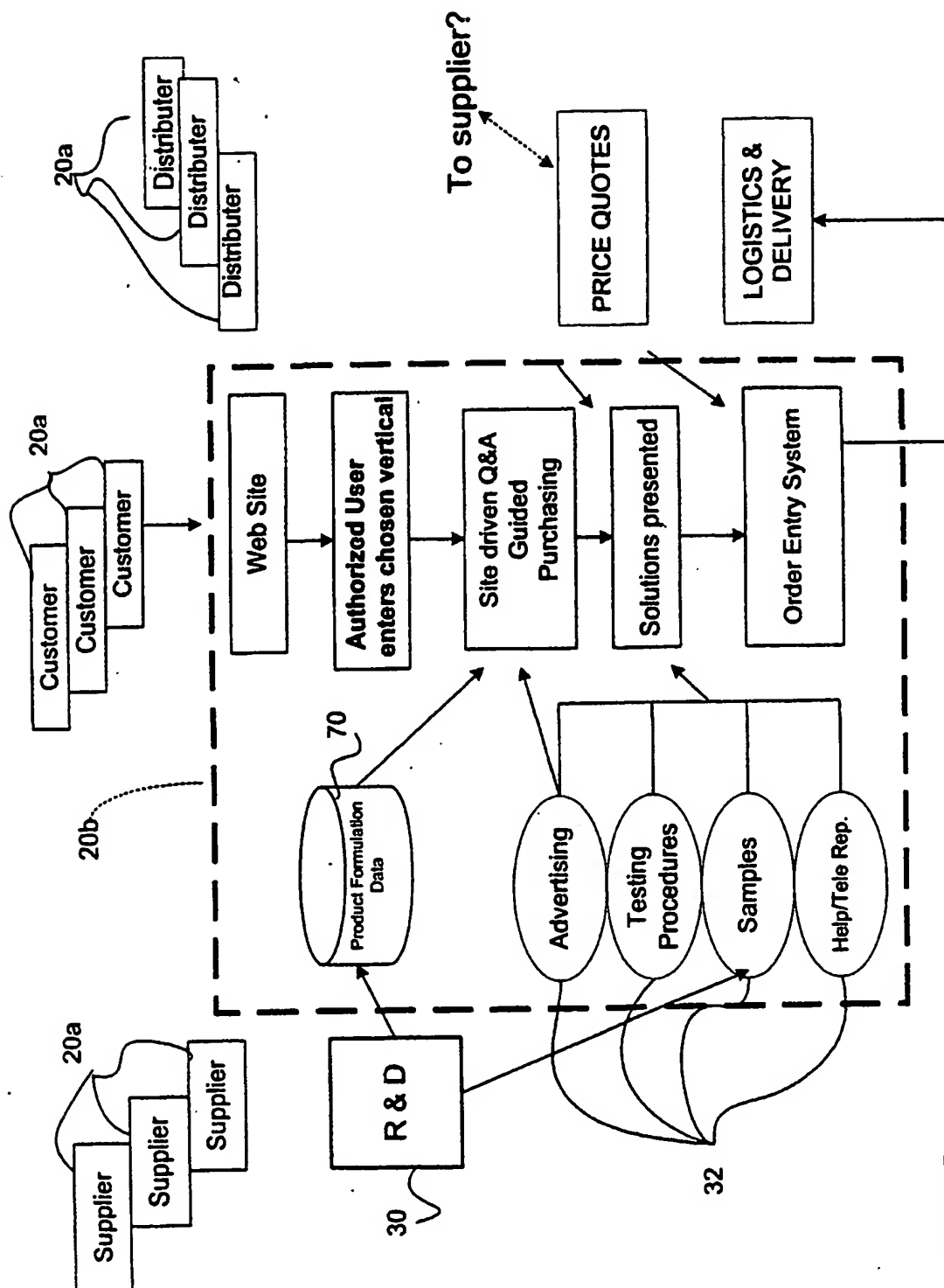


Figure 5



AC Coupling an External  
CMOS Clock Powered  
from a Single Positive  
Supply, V+

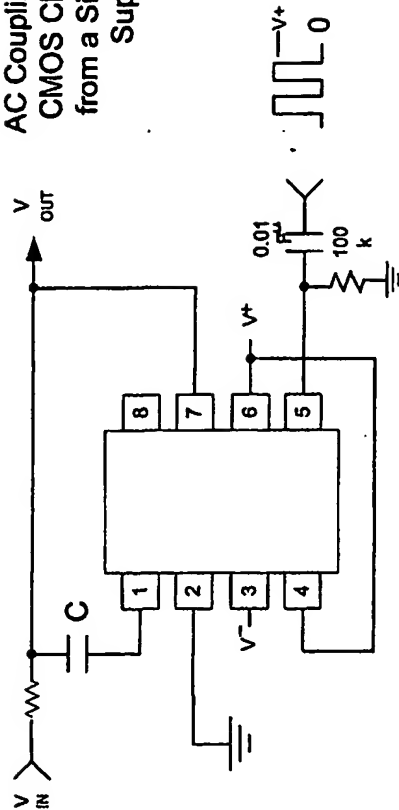


Figure 6A

Filtering AC Signals  
from High DC Voltages

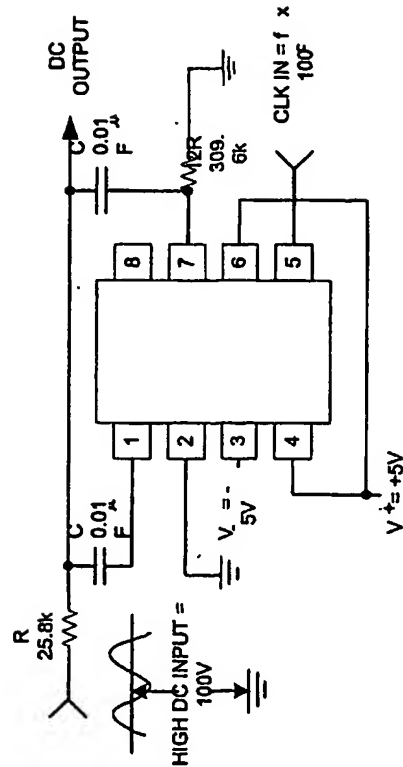


Figure 6B

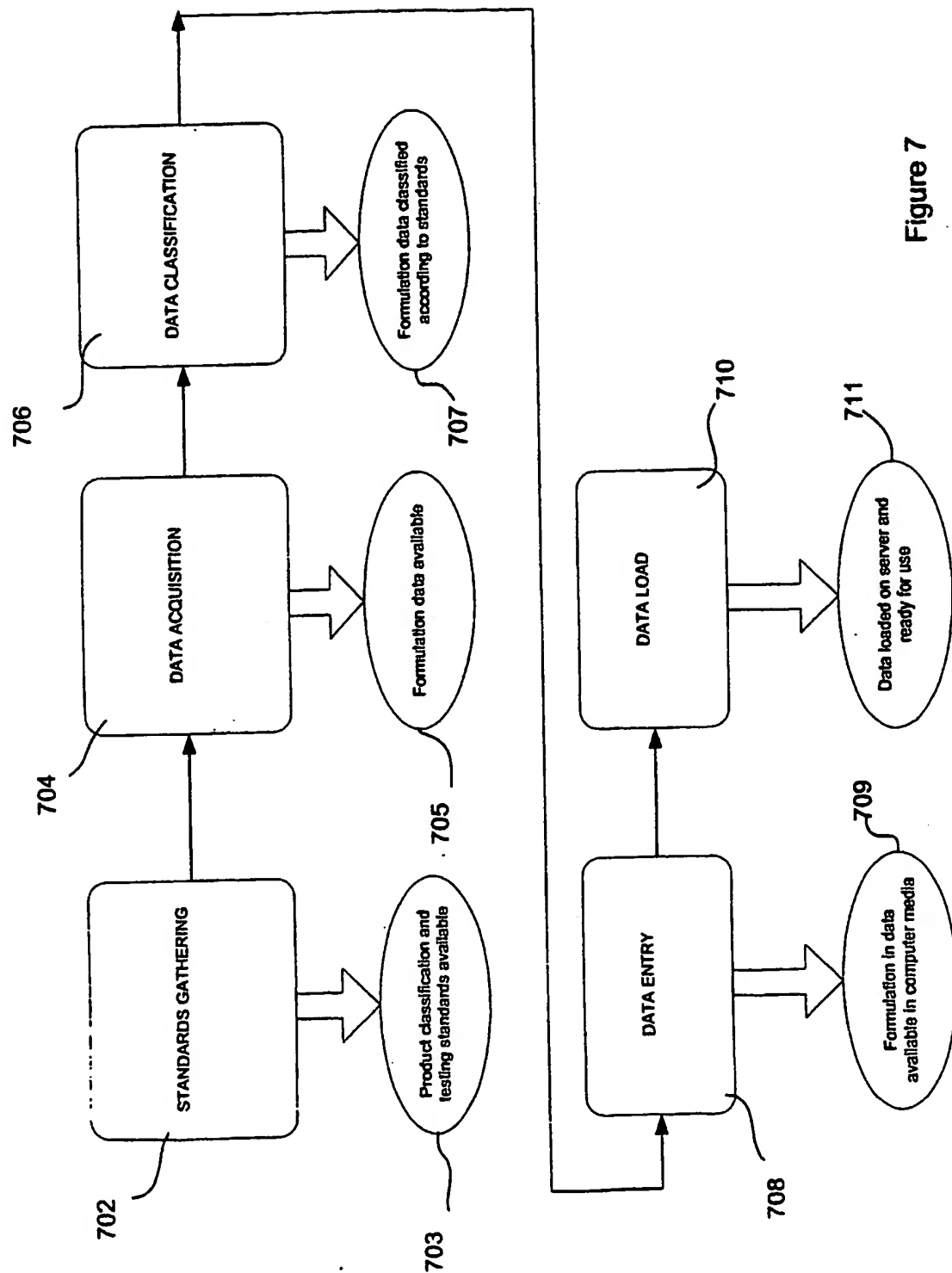


Figure 7

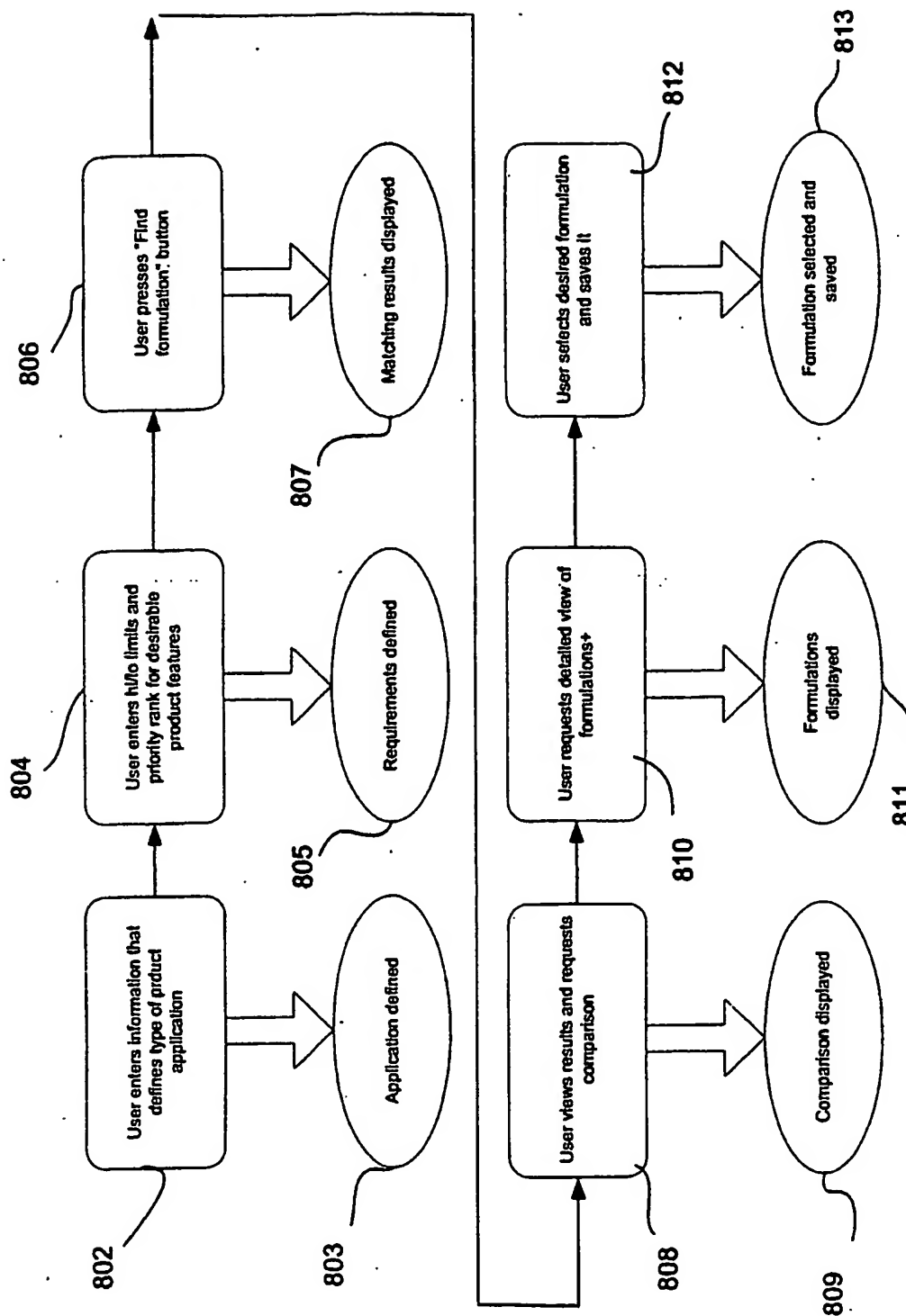


Figure 8

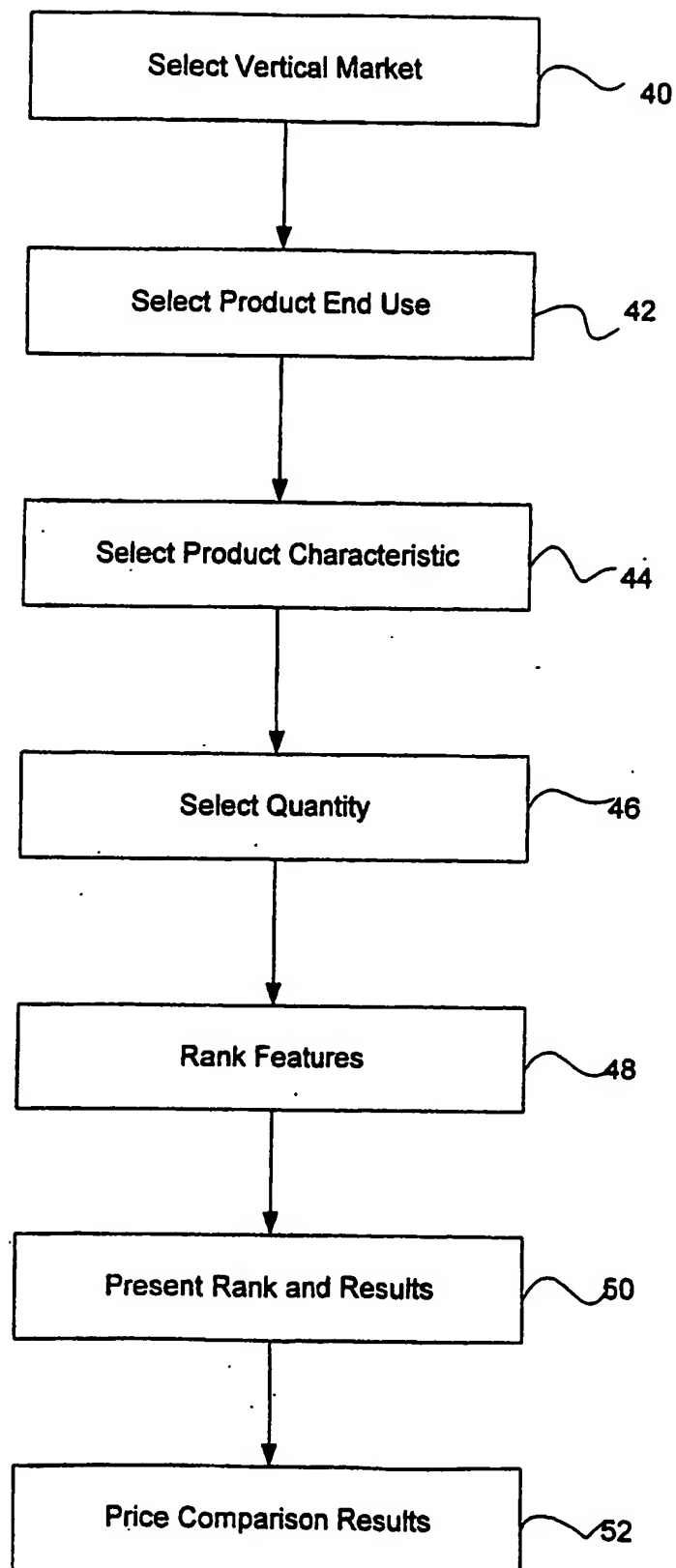


Figure 9

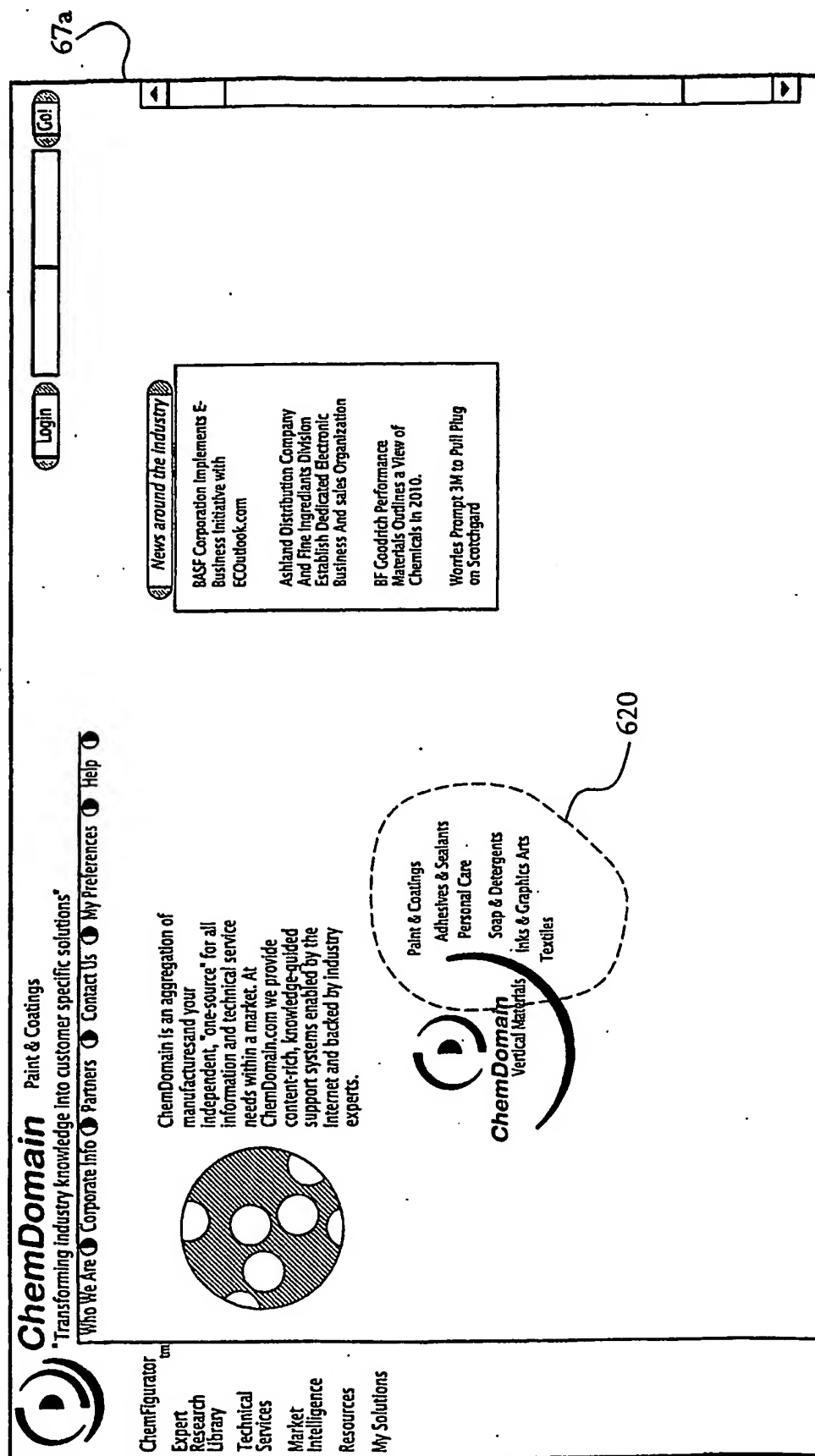


FIG. 10

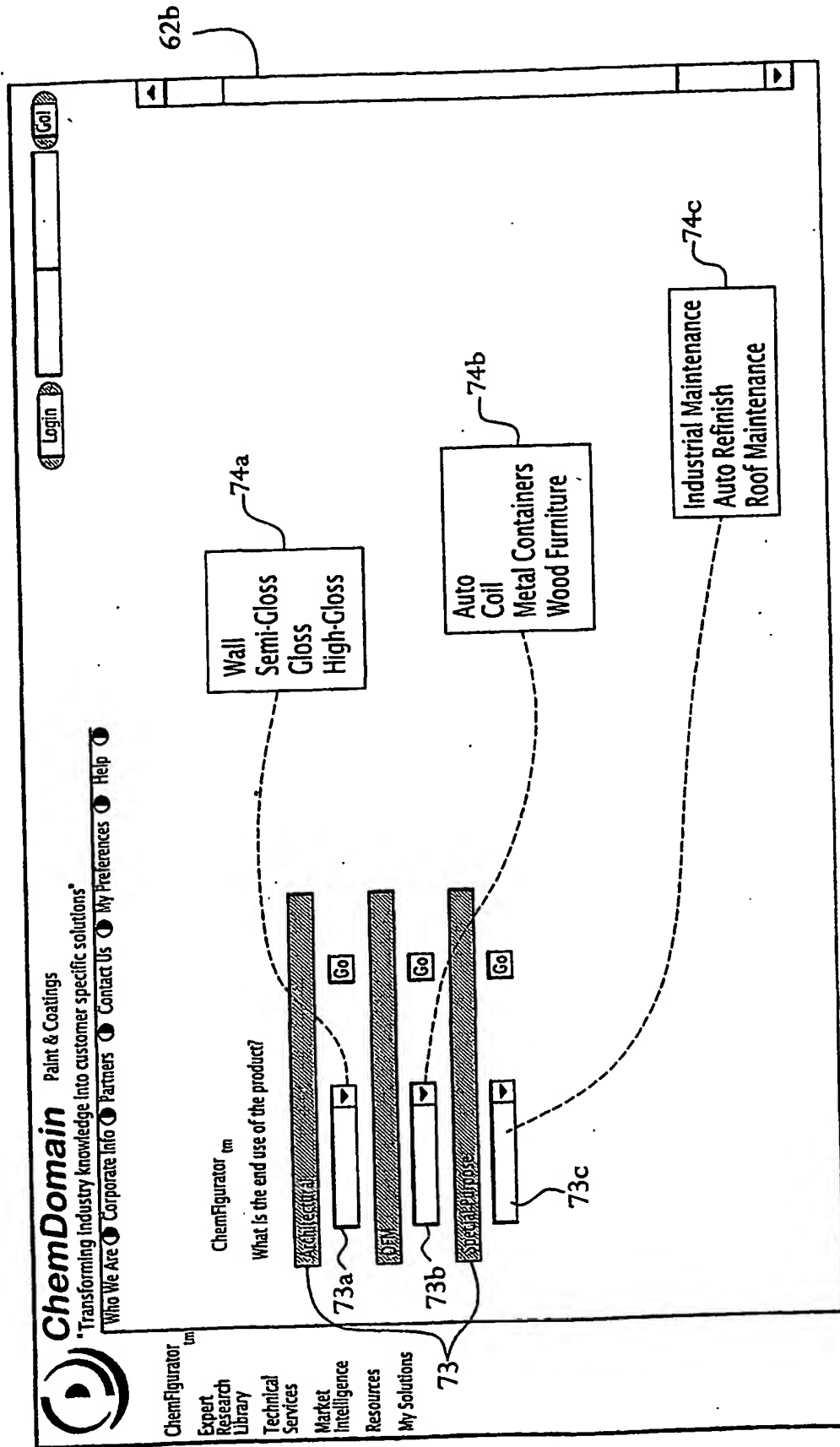



FIG. 11

62c



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ChemFigurator<sup>™</sup>

What is the end use of the product?

☐ Water Based | ☐ Solvent Based | ☐ No Preference

Where will the application reside?

☐ Interior | ☐ Exterior

To what substrate will you be applying the product?

☐ Metal | ☐ Concrete | ☐ Plastic

How will you apply the product?

☐ Spray | ☐ Roll | ☐ Brush

What is the desired VOC level of the product?

0  500 g/L

Should the product possess low odor properties?

☐ Yes | ☐ No

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FIG. 12

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62d

**ChemFigurator** tm

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Back Start Over

**Industrial > Exterior > Solvent: Metal Spray, VOC500, Odor No** 630

What is the estimated annual consumption of this product? (gallons)  631

Acceptable Price per Gallon	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>
Set to Touch	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>
Tack Free	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>
Tukon Hardness (1 Day)	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>
Tukon Hardness (1 Month)	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>
20° Gloss (Initial)	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>
20° Gloss (QUV, 250 hr)	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>
20° Gloss (CCH, 500 hr)	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>

Submit

FIG. 13



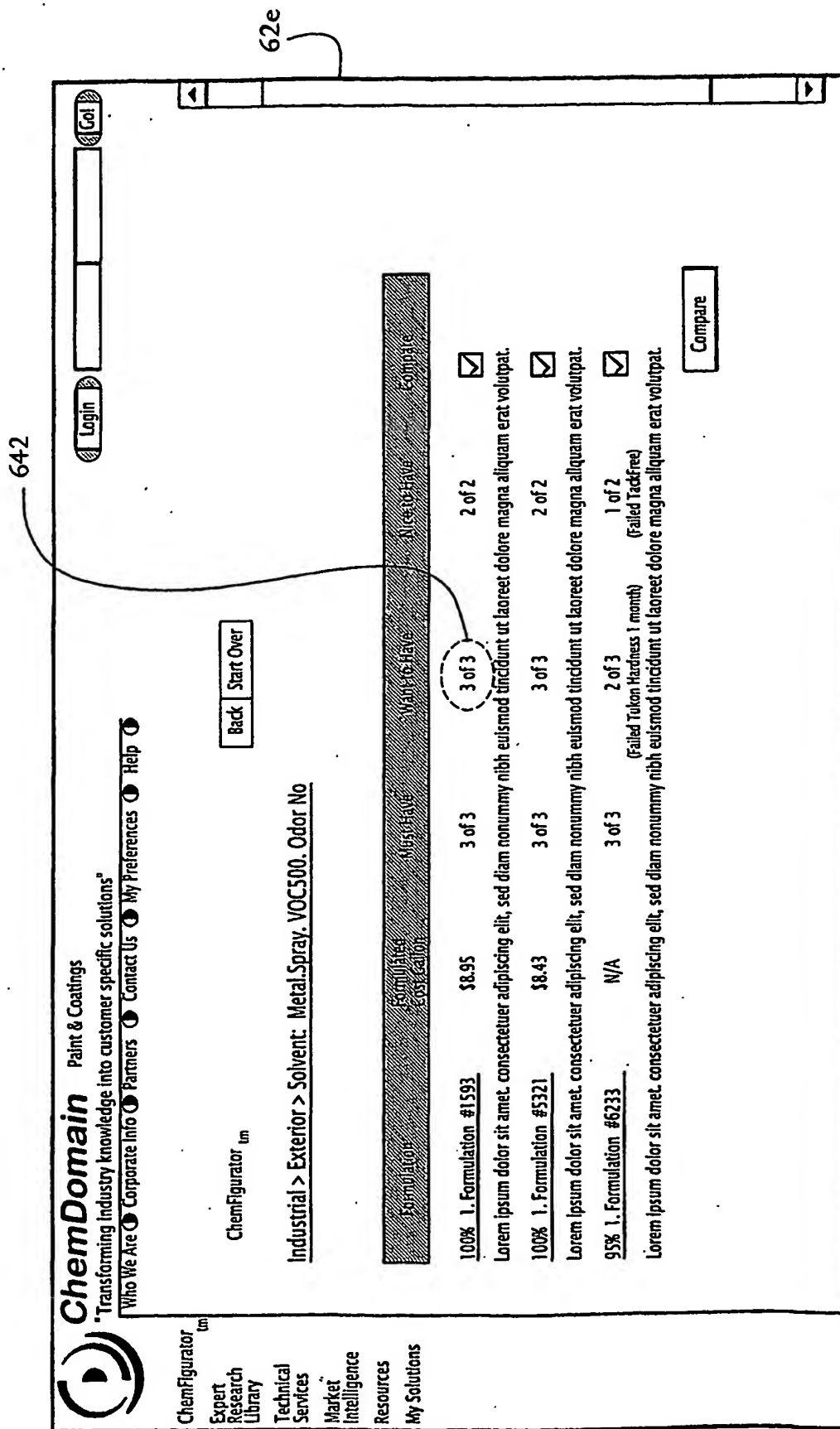



FIG. 14

62F



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**Industrial > Exterior > Solvent: Metal Spray, VOC500, Odor No**

1. Formulary #1593: Set-to-Touch 20 min- Tack Free 90 min - Tukon Hardness (1 day): 2.1 - Tukon Hardness (1 month): 5.5, 20 Gloss (initial): 83- 20 Gloss (QUV, 250hr): 17- 20 Gloss (CCH, 500hr)

		Lab tested	
<b>Alkyd Resin</b>			
Alkyd Resin [1]	McWhorter 5811	View	206.8 23.91 \$0.23
Titanium Dioxide [2]	Kronos 2090		310.2 9.10 \$0.34
n-Butyl Acetate	Union Carbide		52.7 7.16 \$0.16
<b>Other Resin</b>			
Alkyd Resin	McWhorter 5811	View	206.7 23.90 \$0.12
n-Butyl Acetate	Union Carbide		164.4 22.33 \$0.14
Acrylated Melamine Resin	Solutia Santolink AM 547		100.7 11.32 \$1.25
Flow Modifier	Byk 300		2.1 0.27 \$0.03
<b>Other Additive</b>			
18% Cobalt	Manosec 18%		1.3 0.14 \$0.56
18% Zirconium	Manosec 18%		4.1 0.45 \$0.75
10% Calcium	Manosec 10%		7.7 0.96 \$0.14
Drier Accelerator	Acti-8 (R.T. Vanderbilt)		2.1 0.26 \$0.45
Anti-Skimming Agent	Exkin #2 (Huls AG)	View	1.5 0.20 \$0.12

[1] Mc Whorter 5811, 5713, or 5720 short or medium oil alkyd resins. (McWhorter Technologies)

[2] Kronos 2090 Titanium Dioxide. (Kronos Inc.)

FIG. 15

62g

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Industrial > Exterior > Solvent: Metal Spray: VOC500: Odor No

Feature Priority	Desired Criteria	Formulation #1	Formulation #2	Formulation #3
Price	< \$10.00	\$8.95	\$8.43	\$9.12
Setback	10-30 min	20 min	22 min	25 min
Touch	<100 min	90 min	95 min	101 min
Trickiness	1.9 - 3.5	2.1	2.5	2.6
Tutor	5.0 - 7.0	5.5	6.0	5.8
Harmonious (1 Day)	82-85	83	85	85
Harmonious (1 Month)	15-25	17	19	23
20% Gloss (Initial)	10-50	15	22	55
20% Gloss (100% 250hr)		100% Match	95% Match	92% Match
20% Gloss (100% 500hr)		Submit RFQ	Submit RFQ	Submit RFQ

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FIG. 16

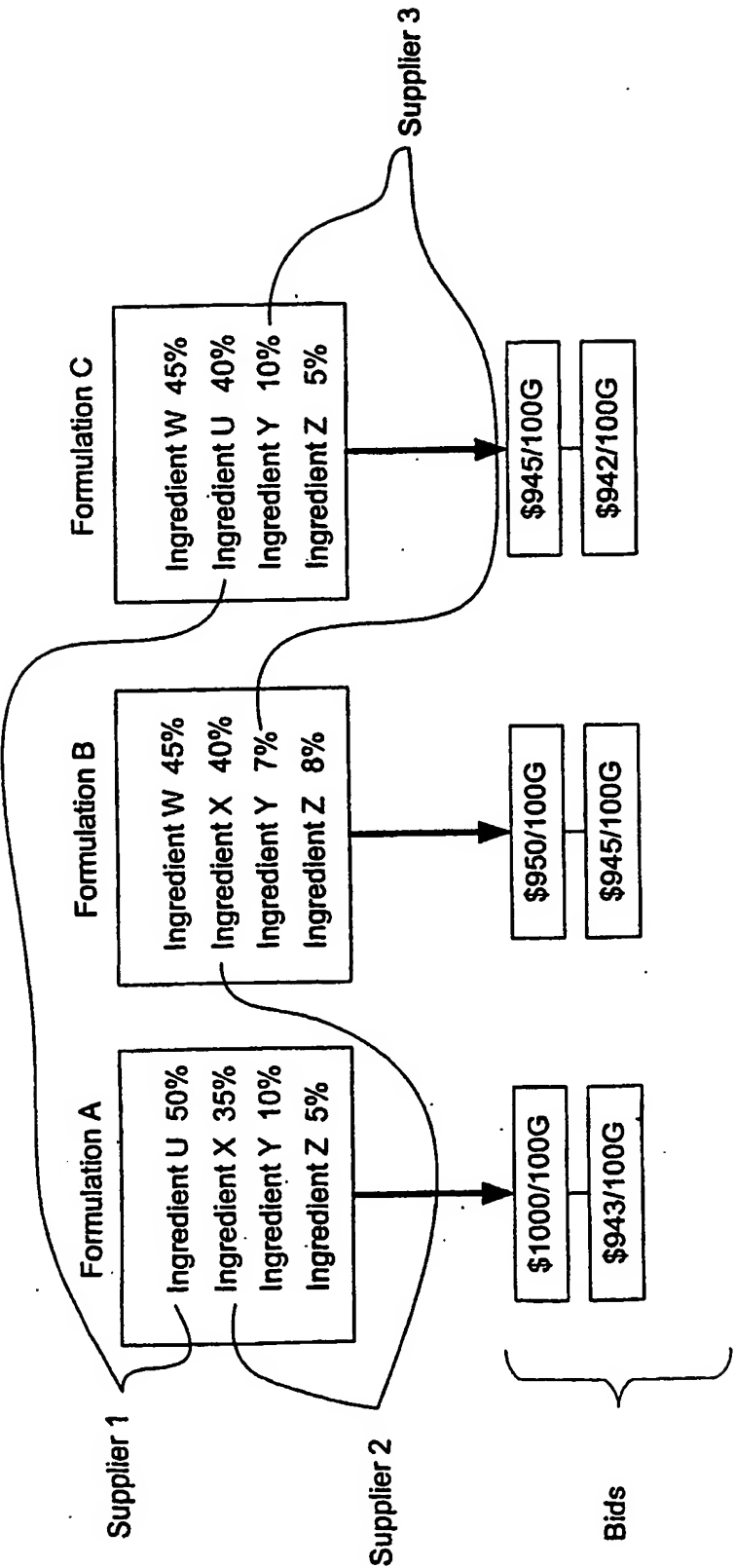


Figure 17

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/03878

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/60

US CL : 705/26

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Dialog search terms: customized formulations

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	No Author, "getPlastic.com Opens First E-Market to Help Plastics Processors Procure High-Performance Resins, Create Custom Compounds" PR Newswire, 13 June 2000, whole document	1-38
A,E	No Author, "Need2Buy Releases 'Next Generation' E-Procurement Solution for Electronic Components Industry" Business Wire, 20 March 2001, whole document	1-38
A	No Author, "LNP Introduces Web-Based Data" Flame Retardancy News, v.9, n.10, October 1999, whole document	1-38

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"A"	document defining the general state of the art which is not considered to be of particular relevance		
"B"	earlier document published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reasons (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"A"	document member of the same patent family

Date of the actual execution of the international search

11 MAY 2001

Date of mailing of the international search report

08 JUN 2001

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M. Kemper

Telephone No. (703) 305-9589

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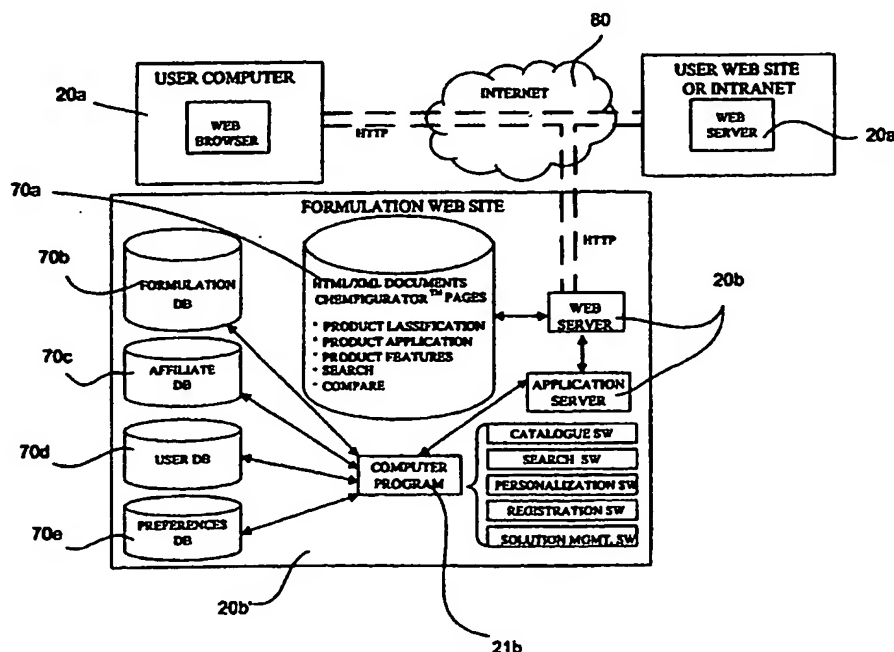
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- (71) Applicant (*for all designated States except US*): CHEM-DOMAIN, INC. [US/US]; Suite 240, 2250 Hickory Road, Plymouth Meeting, PA 19462 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): NORRIS, Eric, W. [US/US]; 471 Athens Avenue, Wynnwood, PA 19096 (US). DESOUZA, Walter, C. [US/US]; 739 Cornerstone Lane, Bryn Mawr, PA 19010 (US).
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(54) Title: SYSTEM AND METHOD FOR CONFIGURING PRODUCTS OVER A COMMUNICATIONS NETWORK



(57) Abstract: A system and method for the automated selection of formulations and/or formulation components by specifying product characteristics serve customers within market segments that use selected components as raw materials for manufacture of specialty products. Customers enroll at a web site (20b') to find, research, store, compare and manage formulations.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

[received by the International Bureau on 8 August 2001 (08.08.01);  
new claims 39-55 added; remaining claims unchanged (3 pages)]

receiving from a customer a plurality of inputs indicative of a set of functional characteristics;

selecting formulations from a supplier grouping wherein the classifications match the input functional characteristics; and

5        outputting the selected formulations to the customer.

39.    A network-based method for selecting components comprising the acts of:  
providing a database of formulations wherein the formulations comprise components;

10        accepting input indicative of performance characteristics of at least one of said formulations;

selecting at least one of said formulations in the database matching the performance characteristics; and

15        providing an output of at least one of said formulations selected in the form of a list of constituent components.

40.    The method of claim 39 wherein the input and the output are transmitted over the internet.

20    41.    The method of claim 39 wherein the input is transmitted from a customer and the output is transmitted to the customer over the internet.

42.    The method of claim 41 wherein the input is received indirectly by way of an intermediary web site.

25

43.    The method of claim 41 further comprising the act of accepting input indicative of an order to purchase at least one of the constituent components.

44.    The method of claim 39 wherein a plurality of formulations are selected.

30

45.    The method of claim 39 wherein the components comprise chemical constituents of a chemical formulation.



46. The method of claim 39 wherein the components comprise electronic elements of an electronic circuit formulation.

47. The method of claim 39 wherein the act of providing a database comprises providing a hierarchical data structure wherein nodes in the structure represent functional characteristics of a class of formulations.

48. A method of obtaining a formulation including constituent components thereof comprising:  
10 specifying a set of characteristics that a formulation should possess;  
transmitting to a server over a network said set of characteristics in a form such that said server can match at least one of the formulations stored in said server to said performance characteristics;  
receiving over the network the matched at least one of the formulations including  
15 the identification of constituent components thereof.

49. A method of obtaining a formulation including constituent components thereof comprising:  
specifying a set of characteristics that a formulation should possess;  
20 transmitting to a server over a network said set of characteristics in a form such that said server can match at least one of the formulations stored in said server to said performance characteristics;  
receiving over the network the matched at least one of the formulations including the identification of constituent components thereof.

25 50. The method of claim 48 wherein said receiving comprises receiving a plurality of matched formulations and constituent components thereof.

51. The method of claim 48 wherein the transmitting and receiving over the network is  
30 over the internet.

52. The method of claim 51 wherein the transmitting over the internet is by way of an intermediate web site.

53. The method of claim 48 further comprising transmitting over the network an order to purchase at least one of the constituent components.

54. The method of claim 48 wherein the constituent components comprise chemical  
5 constituents and the at least one of the formulations comprises a chemical formulation.

55. The method of claim 48 wherein the constituent components comprise electronic elements and the at least one of the formulations comprises an electronic circuit.

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CORRECTED VERSION

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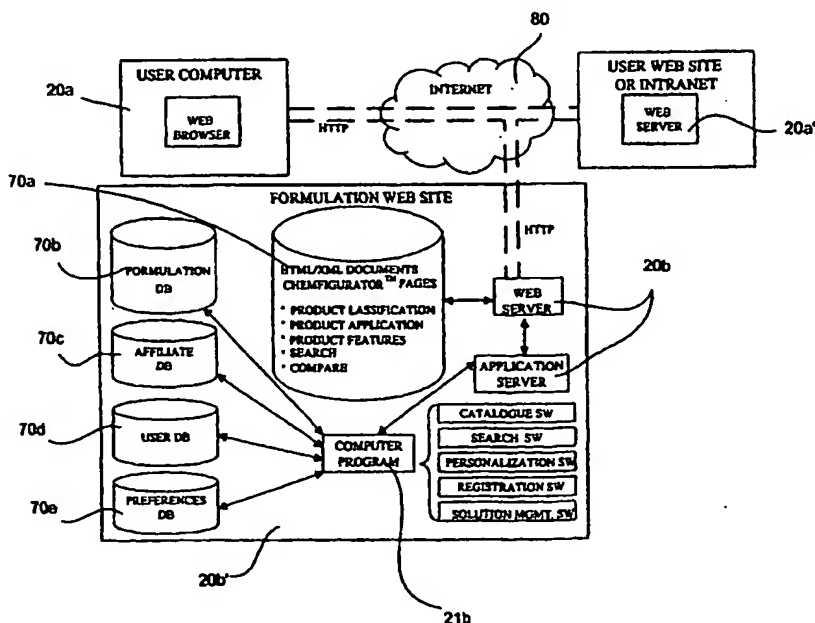
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